



SAN BERNARDINO COUNTY FIRE DEPARTMENT

FIRE PREVENTION STANDARD

HIGH-PILE COMBUSTIBLE STORAGE

CALIFORNIA FIRE CODE Chapter 23: **STANDARD NUMBER 2301**

CFC Building containing high-pile combustible storage shall be accordance with Chapter 23. *In addition to the requirements of Chapter 23, aerosols shall be in accordance with Chapter 28, flammable and combustible liquids shall be accordance with Chapter 34.*

SCOPE:

This standard was developed to assist the applicant in the interpretation of the San Bernardino County Fire Department directives for retail sales and warehouse storage fire protection code requirements.

I. DEFINITIONS:

1. **Commodity** - The combination of product, container and packaging material. A method of classifying the Fire hazard potential of materials in storage.
2. **Commodity Analysis** A questionnaire, which is required to be answered pertaining to the identity and description of stored materials. This standardized format will provide vital information to help determine the required fire protection needed for warehouse businesses. This information shall be filed, as a record of the business, and as part of the application for permit.
3. **High-pile Storage** Defined to include combustible materials in closely packed piles (on pallets or solid pile) twelve (12) feet or more in height, or in racks of combustible merchandise fifteen (15) feet or more in height.
4. **NFPA 13** National Fire Protection Association standard reference for warehouse fire sprinkler protection for storage less than twelve (12) feet in height. "Indoor General Storage" used for on-floor storage of solid-pile or palletized materials and shelf storage. "Rack Storage of Materials."
5. **Warehousing** To deposit, store or stock merchandise in a building or portion thereof. Sections IV and V is to assist in the definitions of aerosol and plastic classifications.

I. CLASSIFICATION OF AEROSOL PRODUCTS:

Aerosol products shall be classified as Level 1, Level 2, or Level 3 according to the definitions given in NFPA 30B Section 1-7.1 through 1-7.4 and Table 1-7. Such classification shall be permitted to be based on data obtained from either a properly conducted, full-scale fire test utilizing a 12 pallet test array or from the Aerosol Flammability Test.

- 1-7.1 **Level 1**, aerosol products are those whose base products contain up to 25% by weight of materials with flash points of 500 degrees Fahrenheit or less.
- 1.7.2 **Level 2** aerosol products are those:
 - a) Whose base products contain more than 25% by weight of water-miscible materials with flash points of 500 degrees Fahrenheit or less, or
 - b) Whose base products contain more than 25% but not more than 55%, by weight of water-miscible materials with flash points of 500 degrees Fahrenheit or less.
- 1-7.3 **Level 3** aerosol products are those:
 - a) Whose base products contain more than 55% by weight of water-immiscible materials with flash points of 500 degrees Fahrenheit or less, or
 - b) Whose flammable propellant equals or exceeds 80% of the net weight of the container contents.

- 1-7.4 In any case where a flammable propellant equals or exceeds 50% of the net weight of the container contents, the classification shall be raised to the next higher level.
- 1-7.5 In any case where the propellant is nonflammable and less than 85% of the net weight of the base product is flammable and water-miscible, the classification shall be Level

V. CLASSIFICATION OF PLASTIC PRODUCTS:

There are two large groupings of plastic: Thermoplastic and thermosetting. Thermoplastics become soft when exposed to sufficient heat and harden when cooled, no matter how often the process is repeated. Thermoset sets into permanent shape when heat and pressure are applied to them during forming. Reheating will not soften these materials.

1. **Group "A" Plastic:**
Group A plastic products are those which incorporate plastic materials having a heat of combustion (Btu/lb or J/kg) that is much higher than that of ordinary combustibles, and a burning rate (lb/min. or kg/min.) higher than that of Group B plastics. Plastics that would normally fall into this category are thermoplastic polystyrene and acrylonitrile-butadiene-styrene. These materials become soft when exposed to heat and harden when cooled, regardless of how often the process is repeated.
2. **Group "B" Plastic:**
Group B plastic products are those which incorporate plastic materials having a heat of combustion and a burning rate higher than those of ordinary combustibles, but not as high as those of Group A plastics. Plastic materials that would normally fall into this category are thermosetting polyesters and thermoplastics, such as polyethylene, polycarbonate, acrylics, cellulotics, nylon, and plasticized polyvinyl chloride.
3. **Group "C" Plastic:**
Group C plastic products are those which incorporate plastic materials having a heat of combustion and a burning rate similar to those of ordinary combustibles. Plastic materials that would normally fall into this category are thermoplastic fluorocarbons, lightly plasticized (rigid) PVC, and most thermosets such as alkyd, amino, phenolics, and silicones. When these materials are combined with other materials that would change the burning characteristics of the commodity, careful analysis is needed to determine if the product still belongs in this classification.

IV. APPLICATION PROCESS:

1. All businesses, which have warehouse areas, shall be required to file an application with the San Bernardino County Fire Department. If it's determined that high-piled stock or hazardous conditions will not exist, a Commodity Analysis Report will not be necessary and application approval will be based on storage less than twelve (12) feet in height.
2. Contact our Planning and Engineering Clerical Personnel for permit applications prior to fire staff interaction (909) 386-8465.
3. A Commodity Analysis is required for warehouse projects that may need specialized fire protection equipment to meet fire protection equipment needs mandated by the fire code. The commodity analysis is needed for the proposed use of warehouse buildings that may have hazards that require in depth information for fire staff review and approval. The applicant/developer shall assist in the preparation of this questionnaire or, under the direction of the Fire Marshal, provide a Fire Consultant (at the expense of the applicant) who specializes in fire protection for warehouse storage. The analysis questionnaire presents questions, which must be answered pertaining to the identity and description of stored materials.
4. Any warehouse business which proposes to store high-piled stock in areas exceeding two thousand five hundred (2,500) square feet of building area shall be required to file application for permit approval. This questionnaire is found in the packet, prepared by our office, called:

V. FIRE STAFF FEES:

1. It's in the best interest of the business owner to contact the Fire Department for an overall review of the existing facility prior to contract/lease agreements. If consultation is required from the Fire Department personnel, a fee may be required for such services.
2. It shall be necessary, for the business owner to contact a fire sprinkler contractor for the inspection of the existing automatic sprinkler system. Fire Staff will require a report, from the sprinkler contractor, on the existing sprinkler density with certification of the most recent service maintenance date.

ALL FIRE PROTECTION REQUIREMENTS ESTABLISHED IN THE FIRE/BUILDING CODES AND FIRE PROTECTION STANDARDS RECOGNIZED BY THE FIRE DEPARTMENT SHALL BE INSTALLED WITHOUT ALTERATIONS, MODIFICATIONS OR CHANGES.

Alternate methods of providing fire protection to be approved by the fire chief only if application procedures are submitted and approved as suggested in Chapter 1 Section 104.9 of the California Fire Code.



HIGH PILE COMBUSTIBLE QUESTIONNAIRE COMMUNITY SAFETY DIVISION

HIGH PILE COMBUSTIBLE STOCK QUESTIONNAIRE

BUSINESS NAME: _____

BUSINESS ADDRESS: _____

The purpose of this questionnaire is to assist the Fire Prevention Office in determining the Fire Code requirements for the storage of "High Piled Combustible Stock" at your facility. These requirements will be based on the 2007 California Fire Code Chapter 23 and NFPA 13. The following information should be filled out and signed by a qualified person having the necessary code knowledge required for High Piled Combustible Stock e.g., Code Consultant approved by the fire department, Insurance Underwriter or fire Protection Engineer.

1. Commodity Class _____ Source: CFC ☐ NFPA ☐
(If commodity is plastic, please fill out attachment "A")

2. Description of storage:

3. Maximum height of storage: _____ ft.

4. Method of storage is: (Check all that apply)

Encapsulated in plastic *	<input type="checkbox"/>	Non-encapsulated	<input type="checkbox"/>
Wooden pallets	<input type="checkbox"/>	Plastic Pallets	<input type="checkbox"/>
On rack w/solid shelves	<input type="checkbox"/>	On rack with out solid shelves	<input type="checkbox"/>
Bin box *	<input type="checkbox"/>	Solid Pile	<input type="checkbox"/>

* Method of packaging consisting of a plastic sheet enclosing the side and top of a pallet load.

* Five sided box container with the open side facing an aisles

5. Type of racks:

Single Row ☐ Double Row ☐ Multiple row ☐

6. Area of storage

0 - 500 sq. ft.	<input type="checkbox"/>	12,000 - 20,000 sq. ft.	<input type="checkbox"/>
501 - 2,500 sq. ft.	<input type="checkbox"/>	20,001 - 300,00 sq. ft.	<input type="checkbox"/>
2,501 - 12,000 sq. ft.	<input type="checkbox"/>		<input type="checkbox"/>

7. Sprinkler information

a) Sprinkler density			
b) Rack Sprinkler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
c) Temperature rating of sprinkler head in:	Ceiling F ^o	Racks	F ^o
d) Type of sprinkler head (i.e., EFSR, ELO, OR			
e) Provide technical data sheet for sprinkler head			

8. Building Height?			
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9. Distance from top of storage to sprinkler deflector?			FT.
10. Flue space: Transverse		Longitudinal	
inches		inches	
11. Smoke vents?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Ratio: Sq. Ft.

12. Operation?	Automatic <input type="checkbox"/>	Manual <input type="checkbox"/>	Automatic/Manual <input type="checkbox"/>
What is the temperature of operation?			

13. Draft curtains?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Sq. Ft. section
Non-combustible?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Ft. Depth

14. Aisle width between racks and storage:	Ft.
Access aisle width (s)	Ft.

15. Smoke Detection system		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Type:	Photoclectric <input type="checkbox"/>	Ionization <input type="checkbox"/>	Beam <input type="checkbox"/> Other <input type="checkbox"/>

16. Maximum cubic feet per pile:			
50,000 cu. ft.	<input type="checkbox"/>	200,00 cu. ft.	<input type="checkbox"/>
75,000 cu. ft.	<input type="checkbox"/>	400,00 cu. ft.	<input type="checkbox"/>
100,000 cu. ft.	<input type="checkbox"/>		<input type="checkbox"/>

17. Access roadways within 150 feet of all portions of exterior walls?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
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18. Access door provided every 100 lineal feet on exterior walls, which face roadways	Yes <input type="checkbox"/>	No <input type="checkbox"/>
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19. Hose stations:		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Location?	Class 1 <input type="checkbox"/>	Class 2 <input type="checkbox"/>	

Signature: _____

Title: _____

Phone: _____

ATTACHEMENT A PLASTICS

1.	Group type of plastic in storage? A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/>
2.	Percentage of plastic of storage? _____ % (volume or weight)
3.	If group type is "A" check each item below that applies to your commodity. Is the Plastic: Expanded <input type="checkbox"/> Non-expanded <input type="checkbox"/> Free flowing Class IV <input type="checkbox"/> How is plastic packaged? (NFPA 13 or NFPA 231-1-2) Exposed <input type="checkbox"/> Carton <input type="checkbox"/> How is plastic piled? (NFPA 13, NFPA 231-1-2) Stable <input type="checkbox"/> Unstable <input type="checkbox"/> Solid unit load <input type="checkbox"/>

GROUP A

ABS (Acrylonitrile-Butadiene-Styrene Copolymer)	Polycarbonate
Acrylic (Polymethyl Methacrylate)	Polyester Elastomer
Acetyl (Polyformaldehyde)	Polyethylene
Butyl Rubber	Polypropylene
EPDM Ethylene-Propylene Rubber	Polystyrene
FRP (Fiberglass Reinforced Polyester)	Polyurethane
Natural Rubber (If expanded)	PVC (Polyvinyl Chloride - highly plasticized, e.g., Coated Fabric unsupported film)
Nitrile Rubber (Acrylonitrile Butadiene Rubber)	SAN (Styrene Acrylonitrile)
PET (Thermoplastic Polyester)	SBR (Styrene-Butadiene Rubber)
Polybutadiene	

GROUP B

Cellulosics (Cellulose Acetate, Cellulose Acetate Butyrate Ethyl Cellulose)	Propylene Copolymer
Chloroprene Rubber	<i>Natural Rubber</i>
Fluoroplastics (ECTFE - Ethylene- Chlorotrifluoroethylene Caplaxmer, ETFE - Ethylene Tetrafluoroethylene Copolymer FEP - Fluorinated Ethylene)	Nylon (Nylon 6, Nylon 6/6)
	Silicone Rubber

GROUP C

Fluoroplastics (PCTFE-Polychlorotrifluoroethylene, PTTFE-Polytetrafluoroethylene)	PVDC (Polyvinylidene Chloride)
Melamine (Melamine Formaldehyde)	PVF (Polyvinyl Fluoride)
Phenol	PVDF (Polyvinylidene Fluoride)
PVC (polyvinyl Chloride-rigid or lightly plasticized, e.g., pipe, pipe fittings)	Urea (Urea. Formaldehyde)